INSTRUCTIONS

OVERSPEED GOVERNOR

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FIG. 1, E-25557

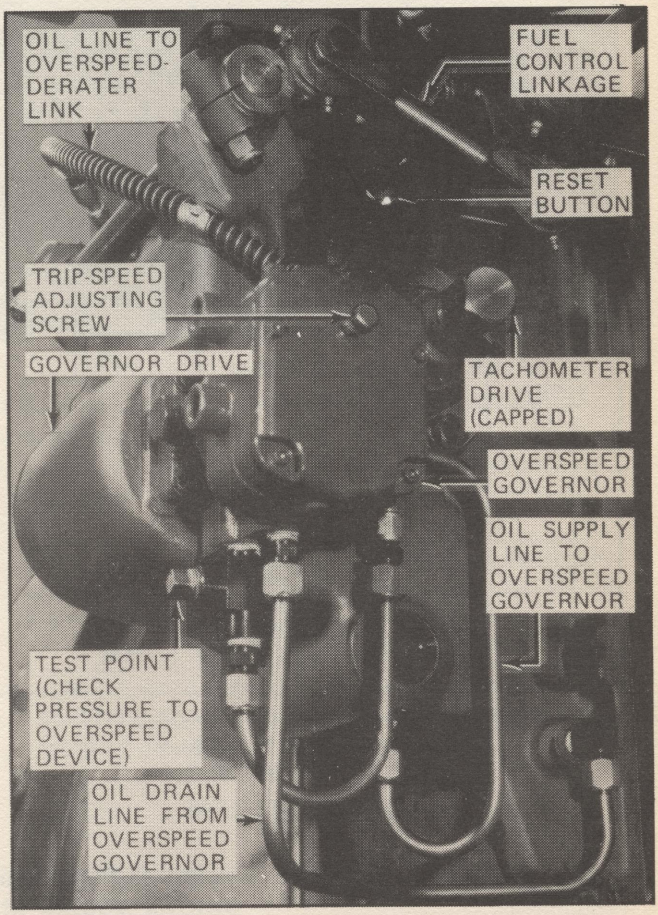

OIL LINE TO OVERSPEED-DERATER LINK
FUEL CONTROL LINKAGE
RESET BUTTON
TRIP-SPEED ADJUSTING SCREW
GOVERNOR DRIVE
TACHOMETER DRIVE (CAPPED)
OVERSPEED GOVERNOR
OIL SUPPLY LINE TO OVERSPEED GOVERNOR
TEST POINT (CHECK PRESSURE TO OVERSPEED DEVICE)
OIL DRAIN LINE FROM OVERSPEED GOVERNOR

FIG. 1. TYPICAL OVERSPEED GOVERNOR ARRANGEMENT.

FOREWORD

This publication covers, in general, the operation, adjustment and maintenance of SG style Woodward governors used for overspeed protection on General Electric diesel engines. Portions of the information contained in this publication have been reproduced through the courtesy of the Woodward Governor Company, Fort Collins, Colorado.

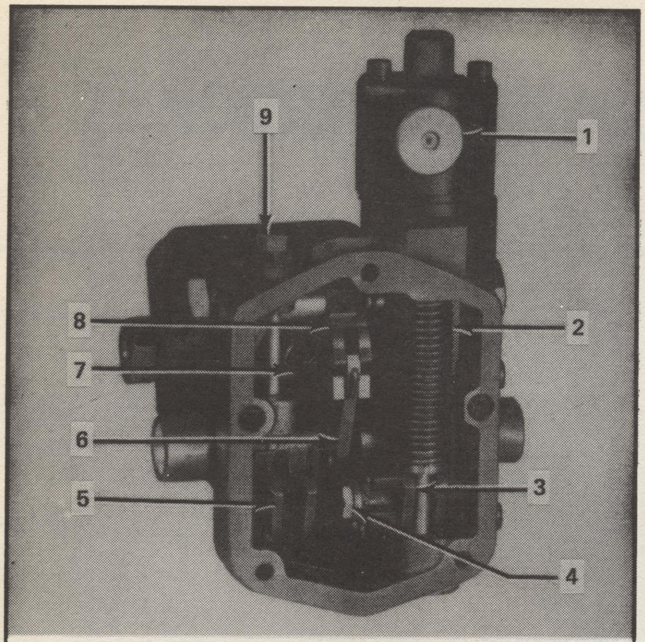
DESCRIPTION

While the external appearance of the governor, Fig. 1, has changed very little, the internal components have been periodically improved.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

Verify numbers for parts, tools, or material by using the Renewal Parts or Tool Catalogs, or contact your General Electric representative for assistance. Do not order from this publication.

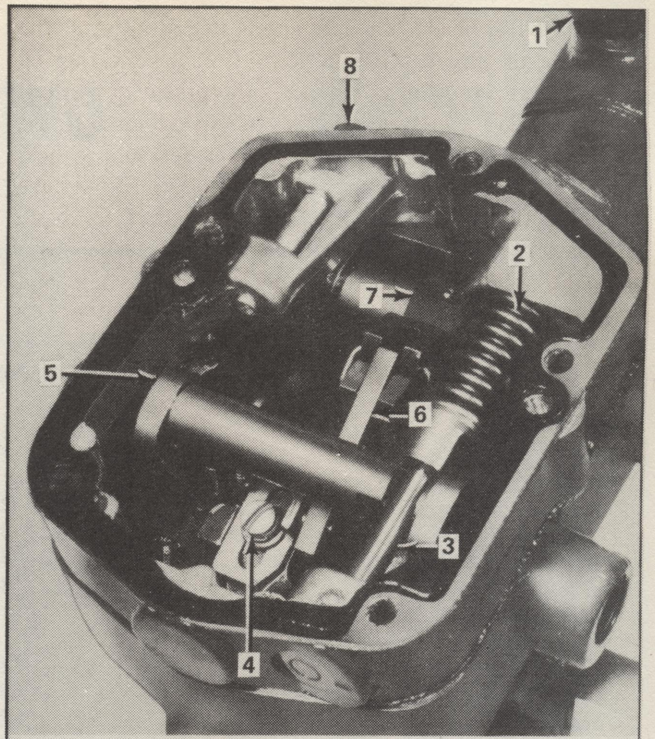
GENERAL ELECTRIC



REF.	DESCRIPTION
1	RESET BUTTON
2	RESET SPRING
3	OVERSPEED LOCKOUT ROD
4	SPEED DROOP ADJUSTMENT (SET AT 50% POSITION
5	TERMINAL LEVER
6	FLOATING LEVER
7	SPEEDER SPRING
8	SPEED ADJUSTING LEVER
9	TERMINAL LEVER STOP SCREW

FIG. 2. OVERSPEED GOVERNOR WITH COVER REMOVED (EARLY PRODUCTION MODEL).

FIG. 2, E-18604



REF.	DESCRIPTION
1	RESET BUTTON
2	RESET SPRING
3	OVERSPEED LOCKOUT ROD
4	SPEED DROOP ADJUSTMENT (SET AT 50% POSITION)
5	TERMINAL LEVER
6	FLOATING LEVER
7	SPEED ADJUSTING LEVER
8	TERMINAL LEVER STOP SCREW

FIG. 3. OVERSPEED GOVERNOR WITH COVER REMOVED (CURRENT PRODUCTION MODEL).

FIG. 3, E-26032

All overspeed governors contain the following components:

1. A pilot valve plunger linked to a speeder spring.
2. A pair of flyweights mounted on the rotating drive shaft – ballhead assembly.
3. A power piston which controls the flow of pressurized oil to and from the overspeed link.
4. An oil-pressure relief valve mounted in the side of the governor case. This valve also functions as a regulating valve and is the inlet point for the governor oil supply.
5. A base portion containing a positive-displacement gear pump.
6. A sub cap which contains the lockout and resetting mechanisms.

OPERATION

ENGINE RUNNING AT NORMAL SPEED (Fig. 4)

NOTE: *In Figs. 4 and 5 the governor is shown with the drive shaft vertical. On General Electric engines it is horizontal. The following text refers to the governor as it is shown in the figures, not as it is mounted on the engine.*

Engine oil at header pressure enters the governor at the relief valve and flows to the suction side of the governor oil pump. The governor oil pump raises the pressure of the oil to that needed to compress the overspeed link. If the pressure produced is greater than that needed to compress the overspeed link, pressure oil moves the relief valve plunger to the left against spring force, and allows oil to recirculate to the suction side of the pump. Figs. 4 and 5 show the relief valve plunger moved to the left and regulating pressure.

The force of the reset spring, transmitted thru the lockout rod and the terminal lever which rotates about the terminal shaft, holds the power piston down in its bore. The lockout latch is disengaged.

The flyweights rotate at 3.466 times crankshaft speed. The force of the speeder spring, as set by adjustment of the trip-speed setting screw, will hold the flyweights in and, consequently, the pilot valve plunger down.

Pressure oil from the pump is delivered thru ports in the rotating pilot valve bushing, around the groove in the pilot valve plunger, and out to the power piston. With the power piston down, oil flows around the groove in the power piston and out to the overspeed link.

The oil under the power piston is connected to drain to the engine crankcase, thru ports in the pilot valve bushing to the small lower groove in the pilot valve plunger, and thru a slanting cross-drilled hole.

ENGINE OVERSPEED TRIPPING ACTION (Fig. 5)

As engine speed increases to the overspeed setting, the increase in centrifugal force moves the flyweights outward and the downward force of the speeder spring is overcome. The toes of the flyweights lift the pilot valve plunger. Pressure oil flows thru ports in the pilot valve bushing, around the groove in the pilot valve plunger, thru another slanting cross-drilled hole in the plunger and out a slot into the passage connecting to the underside of the power piston. The power piston moves up and closes off the supply of pressure oil to the overspeed link.

Oil from the overspeed link flows back around the groove in the power piston, thru slots on the outside of the power piston, and out the top of the power piston bore. Oil then drains to the engine crankcase.

Loss of oil pressure to the overspeed link allows the link to expand, shutting off fuel to the cylinders. (See section on overspeed link for description.)

Upward movement of the power piston rotates the terminal lever, which pushes the lockout rod to the left until the lockout mechanism raises and is latched. Rotation of the terminal lever also raises the floating lever. This reduces the downward force of the speeder spring and allows the flyweights to move out quickly.

TRIP INDICATOR AND RESET

Visual indication that the unit is in TRIPPED position is provided by a red band below the Reset button; visible when the button is out. To reset the governor following an overspeed trip, push in on the Reset button.

CAUTION: *Before resetting, attempt to find cause of tripping and take necessary corrective action.*

ADJUSTMENTS

CAUTION: *Only qualified personnel should be permitted to make adjustments to the overspeed governor.*

The governor has two points for adjustment:

1. The speed droop bracket – located inside the governor on the terminal lever must be set at mid-position.
2. The trip-speed setting screw in the governor cover must be adjusted to provide trip action at the specified overspeed for the engine.

MAINTENANCE

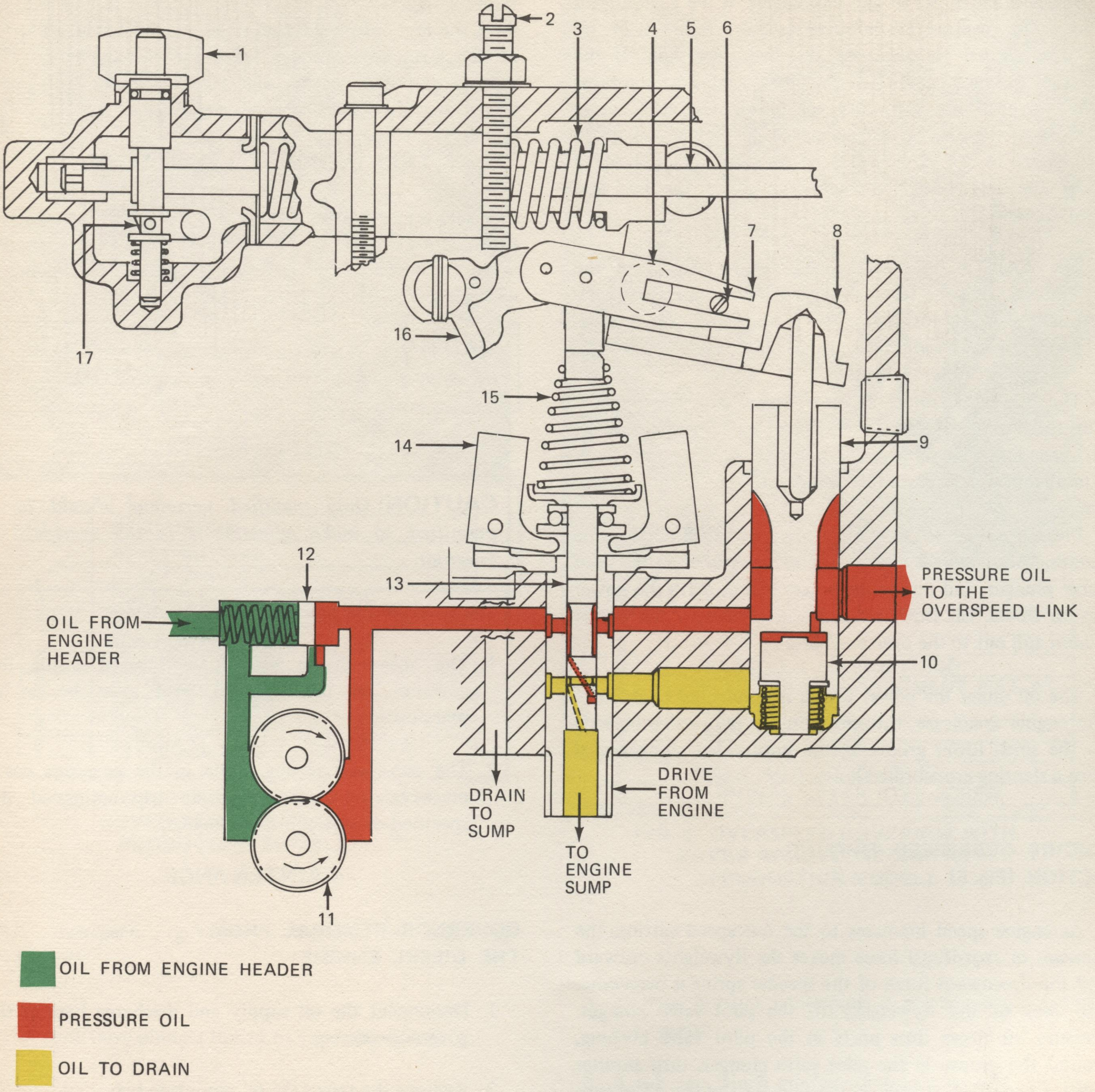
GOVERNOR REMOVAL FROM THE DIESEL ENGINE

1. Disconnect the oil supply and discharge lines at the governor case.
2. Remove the four 5/16-in. mounting bolts.
3. Pull the overspeed governor straight out and off its spline drive.

DISASSEMBLY OF OLDER MODEL (Fig. 6)

Internal Parts

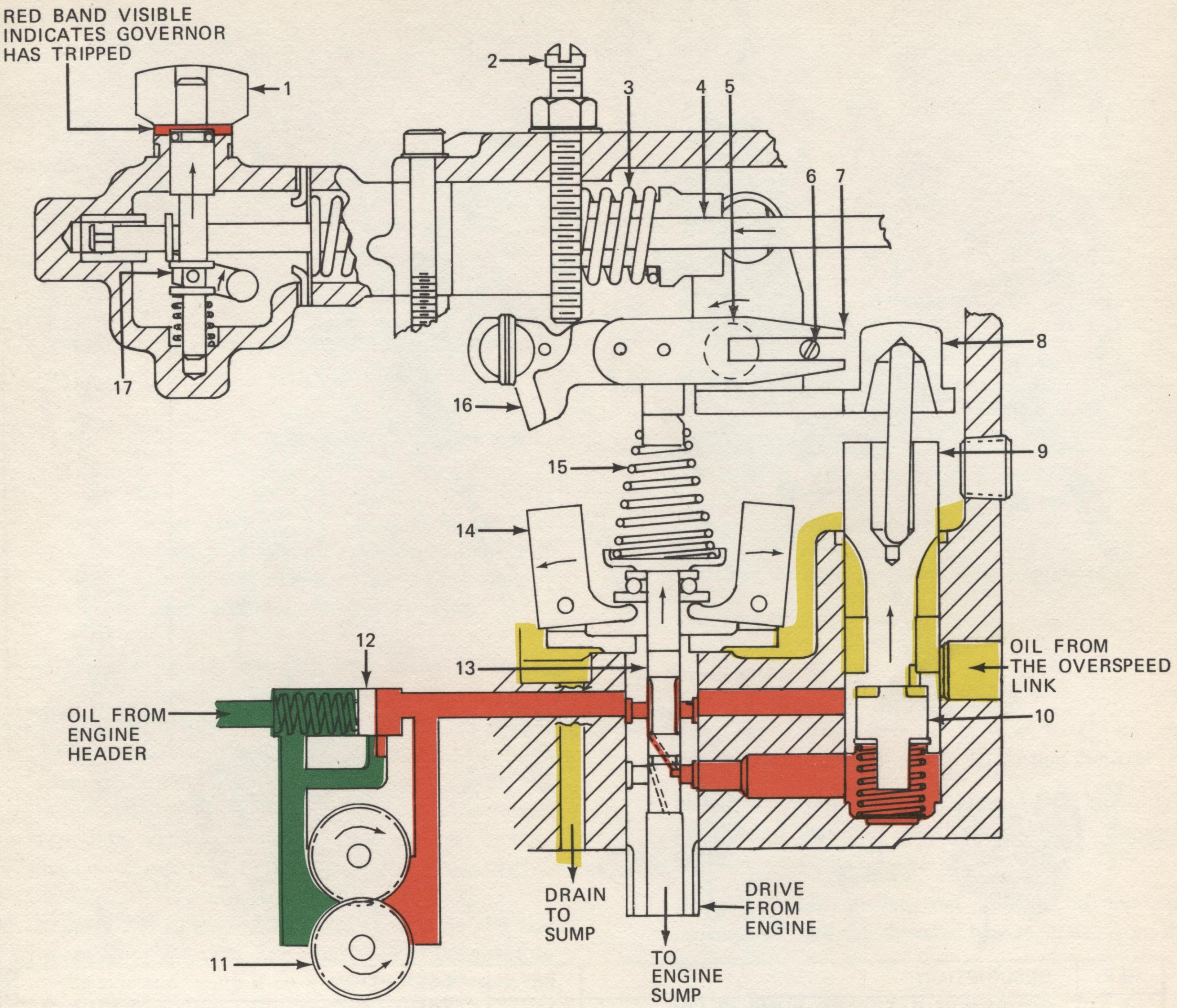
1. Clamp the base of the governor is a vise with wood or copper jaw protection.
2. Remove the three, socket-head cover screws (31).


2
1
3
4
5
6
7
8
17
16
15
14
9
12
13
OIL FROM ENGINE HEADER
PRESSURE OIL TO THE OVERSPEED LINK
10
DRAIN TO SUMP
DRIVE FROM ENGINE
TO ENGINE SUMP
11
OIL FROM ENGINE HEADER
PRESSURE OIL
OIL TO DRAIN

REF.	DESCRIPTION	REF.	DESCRIPTION
1	RESET BUTTON	9	POWER PISTON (DOWN)
2	TRIP-SPEED SETTING SCREW	10	INNER PISTON
3	RESET SPRING	11	GEAR PUMP
4	OVERSPEED LOCKOUT ROD	12	RELIEF VALVE
5	TERMINAL SHAFT	13	PILOT VALVE PLUNGER (DOWN)
6	SPEED DROOP PIN (SET AT 50% POSITION)	14	FLYWEIGHT (2)
		15	SPEEDER SPRING
7	FLOATING LEVER	16	SPEED ADJUSTING LEVER
8	TERMINAL LEVER	17	LOCKOUT LATCH (DISENGAGED)

FIG. 4. OPERATING CONDITION — NORMAL ENGINE SPEED.

FIG. 4, E-26137


RED BAND VISIBLE INDICATES GOVERNOR HAS TRIPPED
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
OIL FROM THE OVERSPEED LINK
OIL FROM ENGINE HEADER
DRAIN TO SUMP
DRIVE FROM ENGINE
TO ENGINE SUMP

🟩 OIL FROM ENGINE HEADER

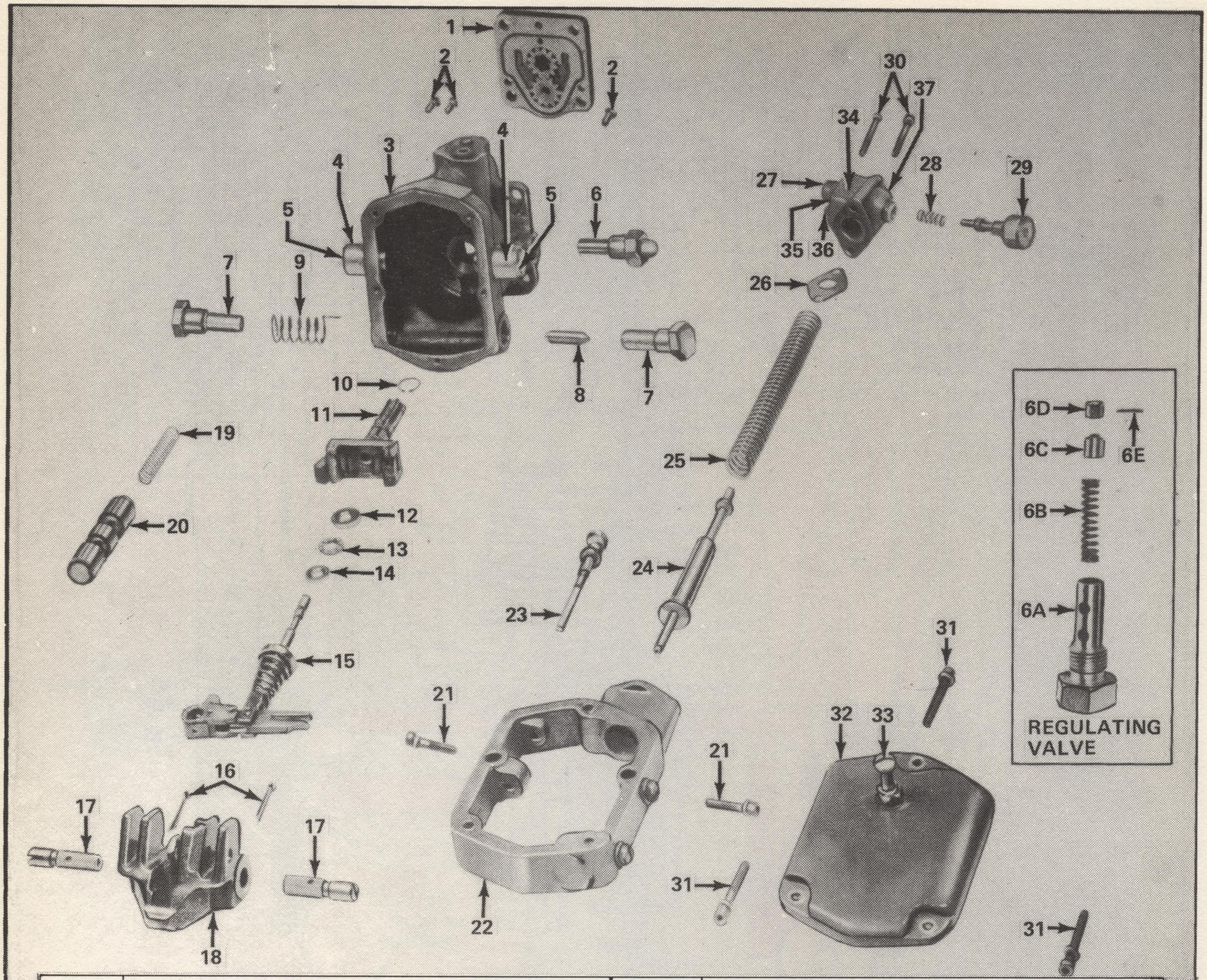
🟥 PRESSURE OIL

🟨 OIL TO DRAIN

REF.	DESCRIPTION	REF.	DESCRIPTION
1	RESET BUTTON	9	POWER PISTON (UP)
2	TRIP-SPEED SETTING SCREW	10	INNER PISTON
3	RESET SPRING	11	GEAR PUMP
4	OVERSPEED LOCKOUT ROD	12	RELIEF VALVE
5	TERMINAL SHAFT	13	PILOT VALVE PLUNGER (UP)
6	SPEED DROOP PIN (SET AT 50% POSITION)	14	FLYWEIGHT (2)
		15	SPEEDER SPRING
7	FLOATING LEVER	16	SPEED ADJUSTING LEVER
8	TERMINAL LEVER	17	LOCKOUT LATCH (ENGAGED)

FIG. 5. TRIP CONDITION AS A RESULT OF OVERSPEED.

FIG. 5, E-26138


1
2
2
30
37
34
3
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4
5
5
6
27
28
29
35
36
7
9
26
7
8
10
11
19
6D
6C
6E
25
6B
20
12
13
14
24
23
6A
31
15
21
32
33
REGULATING VALVE
21
16
17
17
31
22
18
31

FIG. 6, E-9726B

REF.	DESCRIPTION
1	GOVERNOR BASE AND PUMP GEARS
2	SLOTTED SCREWS (BASE)
3	GOVERNOR CASE
4	TERMINAL SLEEVE
5	WELCH PLUG
6	RELIEF VALVE
6A	SLEEVE
6B	SPRING
6C	PLUNGER
6D	BUSHING
6E	PIN
7	SPACER CAP
8	PIN
9	TORQUE SPRING
10	DRIVE SHAFT SNAP RING
11	DRIVE SHAFT AND BALL HEAD ASSEMBLY
12	THRUST BEARING LOWER RACE
13	THRUST BEARING BALL CAGE
14	THRUST BEARING UPPER RACE
15	PILOT VALVE, SPEEDER SPRING AND FLOATING LEVER ASSEMBLY
16	COTTER PIN
17	TERMINAL SHAFT
18	TERMINAL LEVER
19	SPRING
20	POWER PISTON
21	SOCKET HEAD SCREW (OUTER CASE)
22	SUB CAP
23	STOP SCREW
24	LOCKOUT ROD
25	RESET SPRING
26	SPRING SEAT SPACER
27	LATCH HOUSING
28	SPRING
29	RESET PLUNGER
30	SOCKET HEAD SCREW (LATCH HOUSING)
31	SOCKET HEAD SCREW (COVER)
32	GOVERNOR COVER
33	SCREW (TRIP SPEED ADJUSTING)
34	LATCH PIVOT PIN
THE FOLLOWING HIDDEN INSIDE PART 27:	
35	RESET LATCH
36	RESET LATCH SPACER
37	LOCKOUT ROD BUSHING

FIG. 6. EXPLODED VIEW OF GOVERNOR ASSEMBLY — OLDER TYPE.

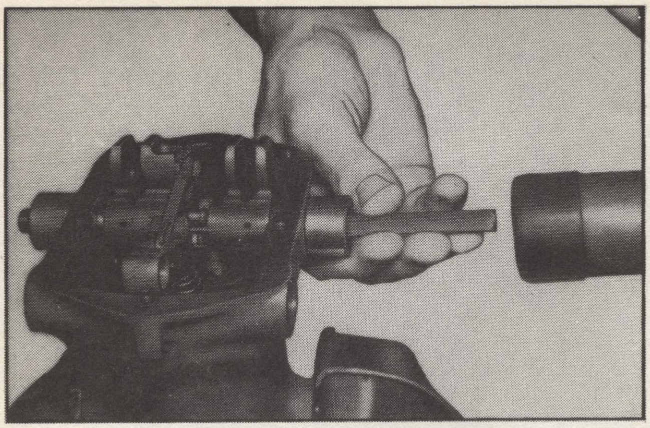

FIG. 7. TERMINAL SHAFT REMOVAL.

FIG. 7, E-9727

FIG. 8, E-9728

3. Remove the two socket head screws (21) mounting the sub cap portion (22).
4. Remove the sub cap portion (22) containing the reset spring (25), overspeed lockout rod (24), lockout latch assembly (27, 28, 29) and stop screw (23). (It may not be necessary to disassemble this portion.)
5. Remove two cotter pins (16) from the terminal lever.
6. Rotate the floating lever (15) out of the way and tap the terminal lever (18) as far as possible to one side until the terminal sleeve (4) comes part way out. Pull the terminal sleeve the rest of the way out using two pry bars, jacking evenly and taking care not to damage the sleeve.
7. Remove the splined terminal shaft (17) on the side where the Welch plug was removed. Lay the governor on its side and bump it on a wooden block until the shaft can be grasped with needle nose pliers.
8. Insert a rod or suitable tool thru the open terminal shaft bearing and tap the opposite terminal shaft (17) and Welch plug (5) out, Fig. 7.
9. Remove the two spacer caps (7) with pin (8) and torque spring (9).
10. Disengage the terminal lever of the pilot valve assembly (15) from the droop bracket pin.
11. Lift the terminal lever and pilot valve assembly out of the governor case.
12. Remove the snap ring (10) from the spline drive shaft, using snap ring pliers.
13. Lift out the ball head and drive shaft assembly (11).

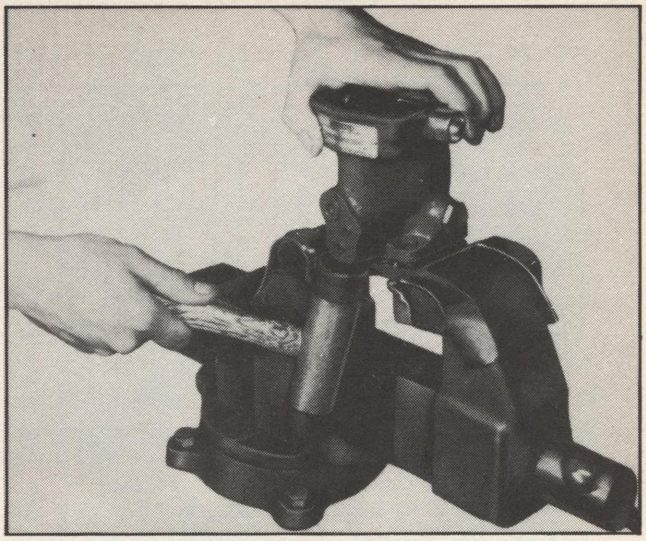

FIG. 8. GOVERNOR BASE REMOVAL.

14. Lift out the power piston (20) and spring (19).
15. Remove the relief valve (6).

Base Removal (Fig. 8)

1. Invert the governor case on the work bench. Remove the three slotted capscrews (2) mounting the base (1).
2. Place the governor base in the vise in an upright position so that only the base portion is clamped, Fig. 8.
3. Using a plastic mallet, tap upward on the case protrusions until the doweled base separates from the case.

Relief Valve Disassembly (See Fig. 6 Inset)

1. Drive the retainer pin out, using a short piece of stiff wire of smaller diameter than the pin.
2. Clamp the sleeve hex head lightly in a vise.
3. Thread a 6-32 x 1-1/2 in. screw into the plunger. Using a pair of pliers, pull the plunger and bushing from the sleeve.

Sub Cap Disassembly (Fig. 6)

Generally it is not necessary to disassemble this portion since little wear takes place. If failure of the latch mechanism should occur, it will be necessary to disassemble the parts in the following manner:

1. Clamp the sub cap frame in a vise with the latch housing upward.

2. Loosen the two socket head capscrews (30). Keep a firm grip on the latch housing (27) while removing the mounting screws. It is spring loaded.
3. Remove the reset lockout spring (25) and rod (24). Reset the button (29) and spring (28).
4. The reset latch (35) may be removed from the latch housing as follows:

   a. Place the latch housing (27) in a suitable holder with the small diameter end of the latch pivot pin (34) up.
   b. Using a small punch, drive the pivot pin down from the latch housing, freeing the reset latch and spacer (36).
5. Early model overspeed governors did not have the lockout rod bushing (37) installed in the latch housing (27). The bushing may be installed using a governor bracket drill jig or a new housing may be purchased with the bushing already installed. Contact your local General Electric representative for further details.

GENERAL REPAIRS

Most of the repair work consists of cleaning and polishing parts. All pistons, plunger valves and shafts should move freely without binding or catching. Do not lap in parts except as stated.

Use No. 320 to No. 500 fine grit emery cloth for polishing.

Pilot Valve

Be extremely careful when polishing the pilot valve plunger land. Broken corners on the land will ruin this part. Leave the corners sharp.

Case

If the ground bottom surface of the case is grooved or worn from rotation of the pump gears or scratched from mishandling, it may be surface ground or lapped. DO NOT remove more than 1/32 in. of material.

Base (Fig. 9)

If the ground surface of the base is warped or worn by pump gears, it may be lapped flat on a surface plate, DO NOT remove more stock than necessary to clean up this surface. If depth of the gear pockets is reduced by surface grinding or lapping, the gears will bind and it will be necessary to lap the faces of the gears to allow running clearance.

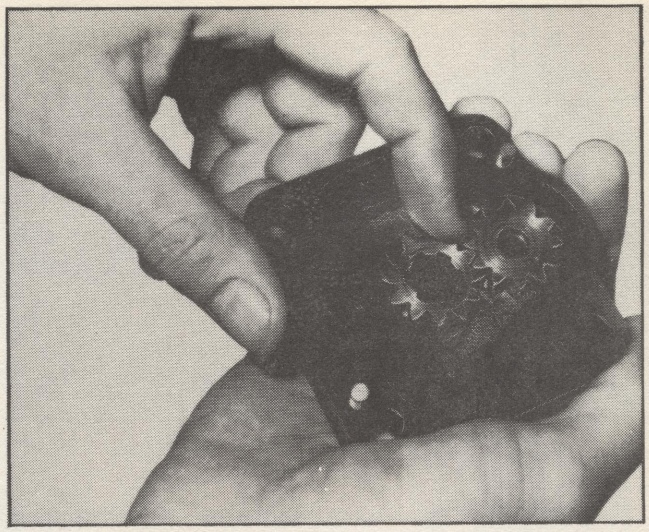

FIG. 9, E-9729

FIG. 9. GOVERNOR BASE WITH GEAR OIL PUMP.

TERMINAL SHAFT BUSHINGS

Terminal shaft bronze bushings, if excessively worn, may be replaced in the following manner:

1. Use a 5/16 in. bolt 5 in. long, and drive out the terminal sleeves as shown in Fig. 10.

2. Press the bushings out of the terminal sleeves and press the new bushings in, using an arbor press.

3. Press both terminal sleeves into the governor housing.

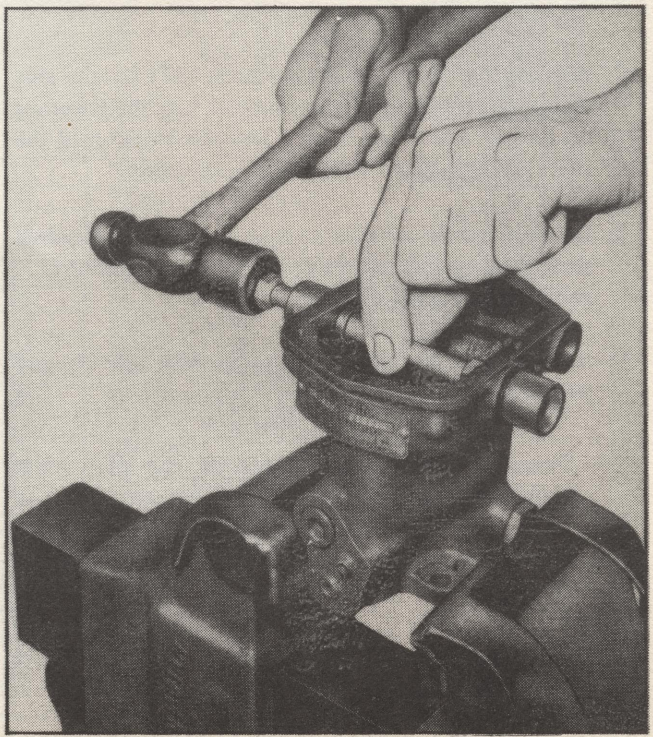

FIG. 10, E-9730

FIG. 10. TERMINAL SLEEVE REMOVAL.

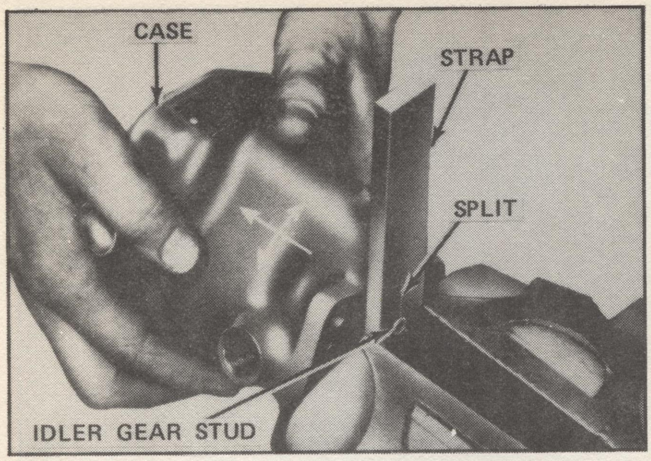

FIG. 11. REMOVING IDLER GEAR STUD.

FIG. 11, E-9705

NOTE: *To prevent breakage of the governor housing from excessive pressure, make a brace from a steel bar to fit exactly across the case in the area of the terminal sleeves before applying pressure.*

4. After replacing the terminal sleeves, line ream bushings using a standard 3/8 in. long reamer.

BALL HEAD

If the ball-arm pins are excessively worn, grind off one end of the riveted head, drive the pins out, and replace them with new pins.

PUMP GEARS

The pump gears should be tested for free rotation as shown in Fig. 9. If the gears turn roughly, inspect for nicks or wear of the gear teeth and interference at the internal corners of the gear pockets.

PUMP IDLER STUD

If worn, the pump idler gear stud can be removed as shown in Fig. 11. A new stud can be installed using an arbor press.

Any damaged or worn parts which cannot be repaired properly with a minimum of effort and time, should be renewed at assembly to ensure proper governor operation on the diesel engine.

ASSEMBLY (Fig. 6)

Renew all gaskets and sealing rings at assembly. DO NOT use sealing compounds on gaskets or seal rings. Contamination of the governor system or parts by sealing compounds may cause failure or malfunction of the governor.

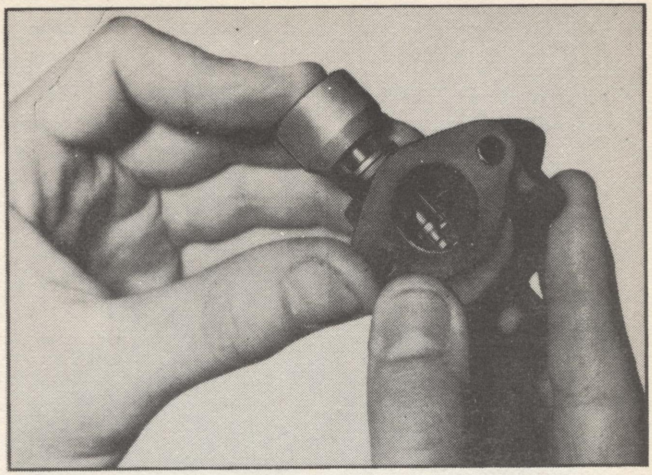

FIG. 12. ENGAGING LATCH PIN IN PLUNGER GROOVE.

FIG. 12, E-9731

During assembly, bare metal and moving parts should be coated with a light coating of clean, new, lube oil. Engine lube oil is recommended.

Latch Assembly

1. Place the latch and spacer into the latch housing, keeping the spacer on the side of the housing with the smaller diameter pivot pin hole. The off-set on the latch should face away from the spacer.
2. Install the pivot pin.
3. Check that the latch moves freely on the pin.

Sub Cap

1. Place the sub cap frame in a vise with the latch housing boss upward.
2. Install the lockout rod (24) and the reset spring (25).
3. Place the reset plunger (29) and spring (28) into the latch housing. Place socket head screws thru the housing. Flip the latch until the latch pin engages in the plunger groove, Fig. 12. While holding the reset plunger in a depressed position, place the spacer (26) over the mounting screws. Install the latch housing over the lockout rod (24), compressing the reset spring until the mounting screws can be screwed in and tightened.
4. Check the operation of the latching mechanism by manually latching and resetting the lockout rod.

Base to Case

1. Clamp the base upright in the vise. Install pump gears in the correct position. Install the base seal ring.

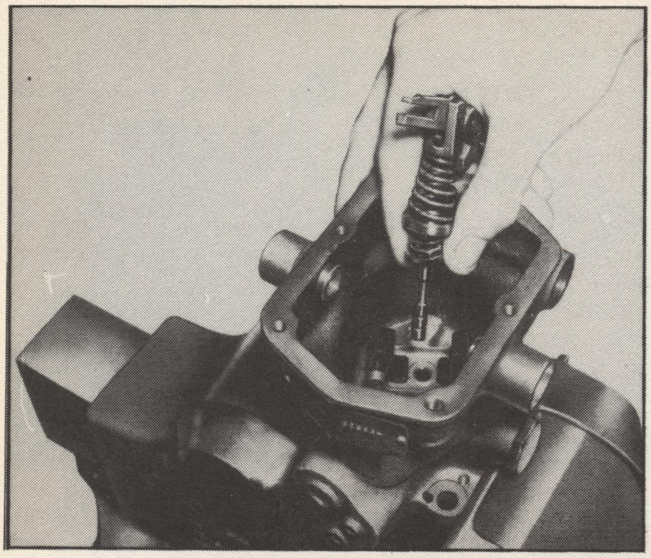

FIG. 13. INSTALLING PILOT VALVE ASSEMBLY WITH THRUST BEARINGS IN PLACE.

FIG. 13, E-9732

2. Coat the surface of the base with oil.

3. Place the case on the base and tap it down lightly.

4. Remove the assembly from the vise and install three slotted capscrews (2).

Inner Governor Parts

1. Clamp the governor upright in the vise.

2. Install the ball head, aligning the spline shaft with the gear pump drive gear. It must rotate freely without binding.

3. Invert the governor and install the drive shaft snap ring (10).

4. Place the pilot valve assembly (15) into the ball head with the thrust bearing races in their proper order with the large race on the bottom, Fig. 13.

*5. Install the power piston spring (19) and the power piston (20).

6. Place the terminal lever into the governor case, aligning the floating lever fork over the droop bracket pin.

7. Install the terminal lever splined shafts (17) so that the cotter pin holes are aligned with the terminal lever pin holes.

8. Install two new cotter pins (16) and secure them.

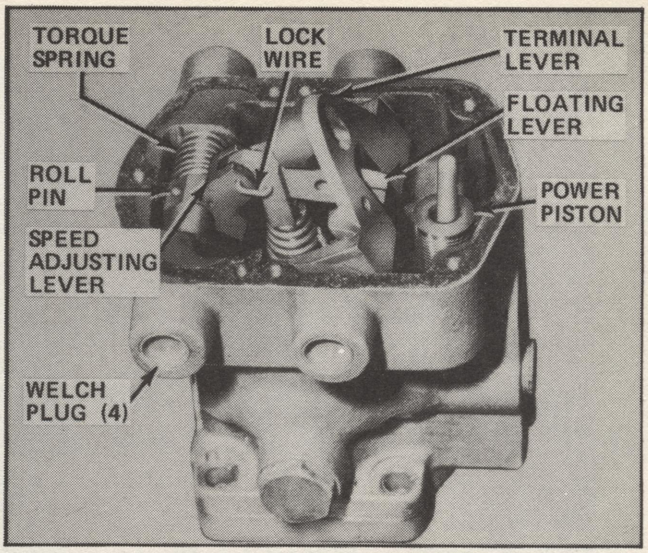

FIG. 14. OVERSPEED GOVERNOR WITH SUB CAP REMOVED (CURRENT PRODUCTION MODEL).

FIG. 14, E-26033

9. Install the pin (8), torque spring (9) and the spacer caps (17).

10. Place the outer case assembly on the governor and mount it with socket head capscrews (21).

11. Reassemble the relief valve, place several drops of oil over it and install.

12. Manually check the movements of parts by latching and tripping the mechanism. All moving parts must move freely without binding or catching.

13. The terminal lever stop screw must allow approximately 1/16 in. travel of the lockout rod after the lockout rod has latched.

The overspeed governor is now ready for testing and final adjustment.

DISASSEMBLY – CURRENT PRODUCTION MODEL (Fig. 14)

1. Remove the five socket-head cover screws. Remove old gasket material and clean mounting faces.

2. Remove the sub cap containing the latch mechanism.

3. Slide out the notched pin from its fit in the terminal lever.

4. Remove the speed droop bracket. The power piston may now be removed if the terminal lever is rotated out of the way.

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*Revisions are indicated by marginal bars.

5. Remove the cotter pins from the terminal lever. Tap with a brass rod on the inner end of one of the terminal lever shafts until the soft plug comes out. Remove that shaft, then work thru the hole and tap out the other plug. Remove the second shaft. Identify the shafts so that serrations and holes line up correctly at reassembly.

6. Drive out the roll pin in the speed adjusting lever.

7. Remove lockwire and lift out floating lever, pilot valve, pilot valve bearing and connecting parts.

8. Using a brass rod against either side of the speed adjusting lever and with the rod as close as possible to the speed adjusting shaft, drive the lever and bushing until the Welch plug comes out of the case.

9. Drive the speed adjusting shaft in the other direction and remove the other Welch plug.

10. Remove shaft, speed adjusting lever and torsion spring.

Further disassembly is the same as that for the older style overspeed governor.

ASSEMBLY

Handle parts with care during assembly. In general, the assembly procedure is the reverse of the disassembly operation.

If necessary to install new bushings, insert a support plate of exactly the correct width between the inner walls of the case. Press bushings in with arbor press.

If the bushings had been moved out of position during disassembly, they must be repositioned.

COLLAPSIBLE POWER PISTON

Current production overspeed governors have a feature which helps prevent lacquering and possible seizing of the power piston, so that it will move freely if an actual overspeed occurs.

A small inner piston is incorporated in the power piston. When the engine is cranked, pressure oil enters the cavity formed between the inner and outer piston, causing the whole assembly to expand slightly, Fig. 15. The power piston moves about 1/16 in. Nothing happens until the engine is stopped and the pressure oil bleeds off. The power piston assembly then collapses. Thus the power piston moves only once during each start-stop cycle.

All existing overspeed governors can be converted to the new-style power piston. Select the necessary parts from Table I.

TABLE I, OVERSPEED GOVERNOR POWER PISTON MODERNIZATION

Component	1974 And Earlier Models	1975 And Later Models	Remarks
Overspeed Governors	136X1514 136X1696	136X2050	In the 1974 and earlier models column, all dash numbers also apply.
	136X1000 136X1695	136X2051	136X2050 and 136X2051 are identical governors except for adjustment.
Power Piston	136X1531 (Grooveless) or 136X1578 (Grooved)	136X2003	All parts listed in this power piston row are obsolete and are no longer available from renewal parts.
	146X1038 or 136X2044	136X2044	
Modernization Kit For Collapsible Power Piston	150X1126	150X1125	
Contains: Power Piston	136X2111	136X2109	When kit is applied, add "-1" to part number of 136X2050 and 136X2051 governors. Dash numbers have not been assigned on older governors.
Inner Piston	136X2112	136X2112	
Snap Ring	136X2107	136X2107	
Spring	136X2108	136X2108	

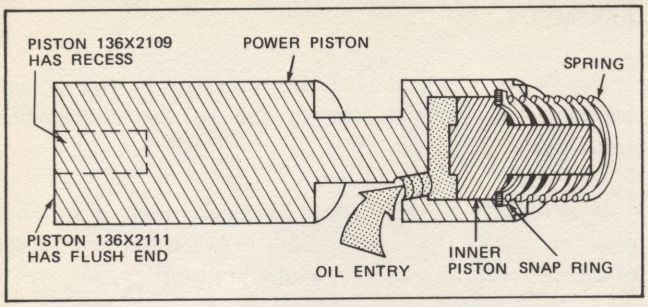


FIG. 15. COLLAPSIBLE POWER PISTON IN CROSS-SECTION.

MODIFYING OLDER GOVERNOR COVERS

Older governors had only three mounting screws holding the cover. The cover can bow outward, permitting oil to leak out and also lower trip speed. On current governors, two more screws have been added midway between top and bottom.

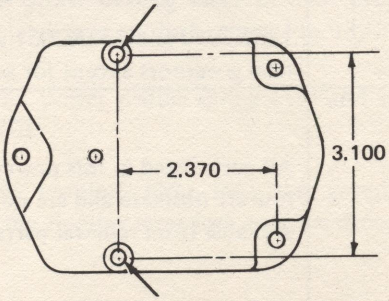
Older governors can be easily modified to accept the two additional screws. Drill and counterbore the cover and drill and tap the outer case as shown in Fig. 16. Either lay out the holes or use a five-hole cover as a drill jig.

The conversion requires two Part 136X1962 screws, two Part 115X1430-1 copper sealing washers and one Part 115X1413 cover gasket.

TRIP ADJUSTMENT

The trip speed is best checked with the overspeed governor set up on a governor test stand. When this is not possible, the overspeed governor can be checked when mounted on the diesel engine. The trip speed is checked in the locomotive in the following manner:

ON COVER, DRILL TWO HOLES, 7/32 DIAMETER. COUNTERBORE 7/16 DIAMETER TO 5/16 GRIP FOR SCREW HEADS TO SEAT.



ON SUB-CAP, DRILL TWO HOLES 15/32 DEEP USING NO. 21 (0.1590) DRILL. TAP 10-32 TO 0.344 DEEP.

ALL DIMENSIONS ARE IN INCHES. LOCATE HOLES WITHIN 0.015 R OF TRUE POSITION.

FIG. 16. COVER MODIFICATION.

1. Install a direct-reading, accurately-calibrated tachometer. Attach it to the standard SAE tachometer drive located on the forward side of the governor drive.

2. With engine running at Notch 8, no load speed, apply a pry bar to the overspeed link to override the governor and increase engine speed. Pivot the pry bar on the head of the clamp bolt which secures the fuel-linkage lever attached to the bottom of the link; allow the pry bar to apply an upward force to the bottom of the oil inlet boss. DO NOT APPLY FORCE AGAINST OIL FITTING OR HOSE. A downward pressure on the outer end of the pry bar will thus raise the overspeed link and the governor power piston, and will cause the fuel pump racks to extend and increase engine speed. At the same time, the overspeed link is free to extend itself when the overspeed governor trips.

3. Slowly and cautiously, raise the engine speed to 1155 ± 10 crankshaft rpm (1716 ± 15 tachometer drive rpm).

4. If the overspeed governor does not trip at speeds specified in Step 3:

   a. Remove the pry bar.
   b. With the engine still in Notch 8, no load speed, back out (turn counterclockwise) the overspeed governor trip-speed adjusting screw until the governor trips.

5. Return Throttle handle to IDLE and restart the engine.

6. Apply the pry bar, as outlined in Step 2, and slowly raise the engine speed. At the same time, slowly turn the trip-speed adjusting screw inward (clockwise). Alternate turning the adjusting screw and increasing the speed until correct trip speed is achieved.

   By keeping a close observation and promptly depressing (at about IDLE speed) the Overspeed Governor Reset button after tripping, the engine will ordinarily recover and continue operating without the need for additional cranking.

CAUTION: *While checking the overspeed governor trip speed, never exceed 1200 crankshaft rpm (1783 tachometer drive rpm). Exceeding this speed may cause serious damage to the engine and to the auxiliary equipment mechanically driven by the engine.*

FIG. 15, E-24530

FIG. 16, E-24531

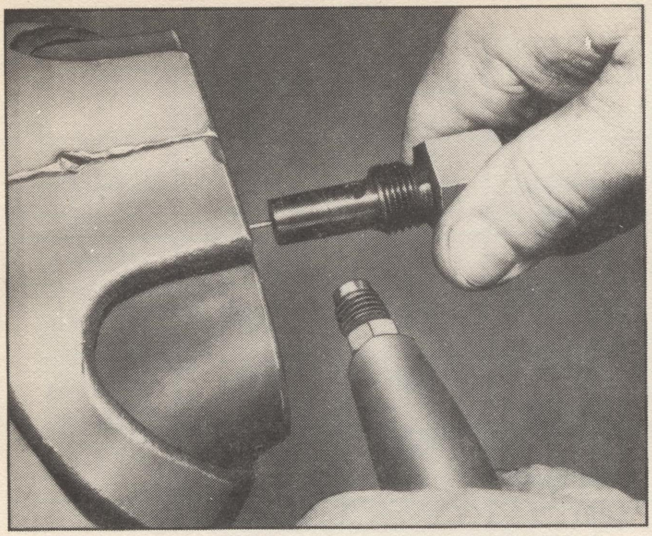


FIG. 17. BLOWING OUT RELIEF VALVE.

RELIEF VALVE ASSEMBLY

The governor oil supply enters a fitting which is also a relief and regulating valve. Dirt on the valve plunger seat may cause the valve to stick open partially, causing a loss of pressure to the overspeed link. If oil pressure to the overspeed link is not at least 95 psi during cranking, the relief valve should either be replaced or disassembled and cleaned.

On older governors, depress the valve plunger as shown in Fig. 17 and blow out the valve thoroughly with compressed air.

On current production governors the relief valve assembly will come apart when the hex fitting is removed from the governor case, Fig. 18. With a soft hammer, tap on the governor case to loosen the plunger and sleeve if they do not easily come out, or use a No. 8-32 screw and thread it into the plunger to pull it out. Use a bent wire to pull out the sleeve if necessary. Thoroughly wash and blow off these parts with compressed air.

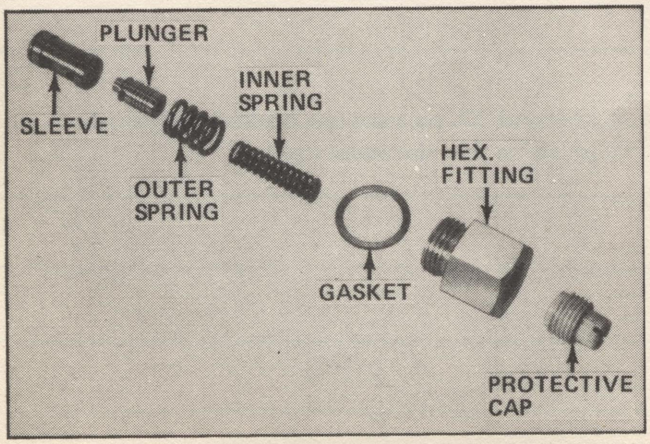


FIG. 18. OVERSPEED GOVERNOR RELIEF VALVE PARTS (CURRENT PRODUCTION MODEL).

FIG. 17, E-21495

FIG. 18, E-26102

FIG. 19, E-26249

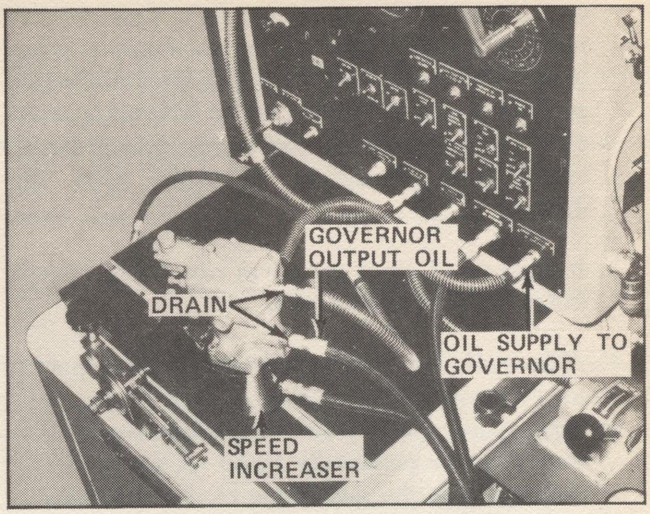


FIG. 19. TEST STAND SET-UP.

WARNING: *When using compressed air for cleaning purposes, an environment potentially hazardous to personnel in the immediate area is created. To prevent physical injury by flying debris, observe all Railroad and government safety regulations.*

SETTING OVERSPEED TRIP ON THE TEST STAND
(Fig. 19)

1. Secure the 2.5 to 1 speed increaser, Part 147X1890, to the test-stand drive shaft and clamp it to the table. Secure the governor to the speed increaser output shaft. The test stand must run clockwise.

2. Connect the oil supply line from the test stand fitting marked ENGINE LUBRICATING OIL DIAPHRAGM to the hexagonal fitting in the side of the governor. This fitting in the governor is the relief valve. Set the oil supply pressure at 15 to 20 psig. This represents the portion of engine header pressure that supplies the overspeed governor and would actually increase as engine speed increases. It is not necessary to increase this pressure on the test stand.

3. Connect the governor output oil line to the test stand fitting marked GOVERNOR OIL PRESSURE.

4. Connect the speed increaser and governor drain lines to the test stand sump.

5. Begin running the governor. Output pressure must be at least 90 psig at cranking speed, which is about 180

engine rpm (250 test stand rpm). Low pressure indicates the relief valve may be stuck open or pump gears badly worn. Continue raising speed if cranking pressure is correct. Pressure should level off at about 175* psig before IDLE speed is reached and should remain there throughout the speed range. See Table II.

6. Increase speed, check and adjust trip setting. Table II shows the speed relationships.

NOTE: *Table II gives values for a 1050 rpm, Notch 8 speed setting. Other engines, having a different rated speed, must have their overspeed governors set proportionally higher or lower. See DATA section in this publication or the companion publication included in the maintenance manual for the specific engine model. To calculate test stand rpm when using a 2.5 to 1 speed increaser, multiply desired crankshaft rpm at trip point by 1.3867.*

TABLE II

Crankshaft RPM	Overspeed Governor RPM (3.466:1 Ratio)	Test Stand RPM (With 2.5:1 Speed Increaser, Part 147X1890)	Output Oil Pressure
180 (Cranking)	624	250	90 psig Minimum
450 (Idle)	1560	624	175* psig Minimum
1050 (Notch 8)	3640	1456	175* psig Minimum
1155 (Overspeed Trip)	4003	1601	0

DATA

Governor Discharge Pressure, Normal Operation (Approximate)	200 psi*
Governor-to-Crankshaft Speed Ratio	3.466 to 1
Tachometer Drive-to-Crankshaft Speed Ratio	1.4857 to 1
Pressure Relief Valve Setting (Nonadjustable)	200 psi*
Overspeed Trip Settings (Adjustable)	
Crankshaft	1155 ± 10 rpm
Tachometer Drive	1716 ± 15 rpm
Overspeed Governor	4003 ± 34 rpm
Overspeed Trip Settings (U34 Overspeed Governor Only)	
Crankshaft	1055 ± 10 rpm
Tachometer Drive	1567 ± 15 rpm
Overspeed Governor	3657 ± 35 rpm

NOTE: *Parts should not be ordered from this publication. Refer to your Renewal Parts Catalog.*

*Approximately mid-1980 the inner spring (Fig. 18) was changed from a nominal 200 psi value to a nominal 300 psi value. These stronger springs will produce pressure values approximately 100 psi higher than the values stated.